

ARI Working Papers

Leadership and Management Technical Area

1987-1988

Supplement

These working papers are published in order to archive material that was not included in other ARI publications. The material contained herein may not meet ARI's usual scientific or professional standards for publication.

December 2001

United States Army Research Institute for the Behavioral and Social Sciences

Approved for public release; distribution is unlimited.

20020103 161

REPORT DOCUMENTATION PAGE

1. REPORT DATE (dd-mm-yy) December 2001	2. REPORT TYPE Final	3. DATES COVERED (from... to) 1987-1988			
4. TITLE AND SUBTITLE ARI Working Papers: Leadership and Management Technical Area, 1987-1988. Supplement			5a. CONTRACT OR GRANT NUMBER		
			5b. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Hunter, F. T.			5c. PROJECT NUMBER		
			5d. TASK NUMBER		
			5e. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences ATTN: TAPC-ARI-PO 5001 Eisenhower Avenue Alexandria, VA 22333-5600			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue Alexandria, VA 22333-5600			10. MONITOR ACRONYM ARI		
			11. MONITOR REPORT NUMBER WP LMTA Supplement		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES ARI working papers were originally unofficial documents intended for limited distribution to obtain comments. These working papers are being archived in order to preserve material that was not included in other ARI publications. The material contained herein may not meet ARI's usual scientific or professional standards for publication.					
14. ABSTRACT (Maximum 200 words): A single working paper dealing with relationships among standardized literacy test scores, ROTC grades, and Officer Basic Course performance.					
15. SUBJECT TERMS Literacy tests, ROTC, Officer Basic Course					
SECURITY CLASSIFICATION OF			19. LIMITATION OF ABSTRACT	20. NUMBER OF PAGES	21. RESPONSIBLE PERSON (Name and Telephone Number)
16. REPORT Unclassified	17. ABSTRACT Unclassified	18. THIS PAGE Unclassified	Unlimited	20	David W. Witter (703) 617-0324

LEADERSHIP AND MANAGEMENT TECHNICAL AREA

Working Paper

87-01

RELATIONSHIPS AMONG STANDARDIZED LITERACY TEST SCORES, ROTC GRADES, AND
OFFICER BASIC COURSE PERFORMANCE

Dr. Fumiyo T. Hunter

January 1987



**U.S. Army Research Institute
for the Behavioral and Social Sciences**
5001 Eisenhower Avenue, Alexandria VA 22333

This working paper is an unofficial document intended for limited distribution to obtain comments. The views, opinions, and/or findings contained in this document are those of the author(s) and should not be construed as the official position of ARI or as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

Relationships Among Standardized Literacy Test Scores,
ROTC Grades, and Officer Basic Course Performance

Introduction

There have been increasing concerns that junior officers lack adequate literacy skills to perform their jobs effectively. In response to a 1986 request from the Commanding General, Training and Doctrine Command (TRADOC), the Deputy Chief of Staff for Operations and Plans formed the Precommissioning Literacy Skills Standards Task Force to assess the feasibility of establishing literacy skills standards for implementation in all sources of commissioning.

The Task Force has accomplished its initial mission with the formulation of the Precommissioning Literacy Standards Pilot Program, designed by the Army Writing Program, TRADOC. The basic approach of this program is to provide (1) diagnostic screening of communication skills in speaking, writing, and reading, (2) developmental teaching to cadets with deficiencies in these skills, and (3) subsequent assessment of their developmental progress. The literacy skills assessment will be aimed at diagnosis and re-evaluation, not at eliminating cadets with inadequate skills from commissioning.

Much of the assessment and developmental teaching procedures will be incorporated into the precommissioning training curriculum in order to provide job-appropriate contents and to maximize the utility of the limited training hours. The pilot program will include one standardized test of writing to be used as one of the diagnostic screening instruments. Many aspects of the program will remain tentative, pending evaluation of the pilot program outcomes and a thorough examination of the social, political, and organizational ramifications of such a program.

Crucial steps in developing literacy skills standards are the selection of methods for assessing literacy skills and the assessment of the accuracy and reliability of the selected methods. Standardized tests of reading/writing provide important benefits. Generally, the tests are quite reliable. They minimize errors in evaluating individuals' skill levels that are due to non-standardized test contents or variations in administration and scoring procedures across divergent institutions in different parts of the country.

However, the objective of establishing the precommissioning literacy skills standards would be to ensure that all newly commissioned officers possess sufficient literacy skills to perform officer duties satisfactorily. Thus, in addition to reliability, the relevance of skills measured by standardized tests to officer performance needs to be addressed. This examination is especially critical in view of the possible drawbacks that may accompany use of standardized tests such as purchase and scoring costs, personnel resources required, impact on program hours available for training, and social/political/policy implications of performance differences by racial/ethnic groups which tend to emerge in large-scale testing of basic skills.

As one of the investigative steps, the Task Force requested Army Research Institute (ARI) to analyze data available at ARI and relevant to the Task Force mission. The purpose of this report is to describe the results of the analyses which focused on the relationships between skills measured by standardized literacy tests and performance in various aspects of officer training. The analysis approach was based on the assumption that standardized tests would be used as diagnostic instruments.

The specific questions addressed were:

1. Do cadets perform at similar levels on different standardized tests? If so, the findings reported below might generally apply to other standardized tests such as the one to be included in the pilot program. In addition, test scores commonly available in cadet records (e.g., SAT) may be substituted for scores on a different test used for literacy assessment.
2. How much do literacy test scores overlap with precommissioning officer training performance? If cadets have literacy problems, do they tend to have problems in other aspects of officer training?
3. How well do literacy test scores predict performance in Officer Basic Courses (OBCs)? Do cadets with relatively lower test scores perform in the lower range in OBC?
4. To what extent can OBC performance be predicted from precommissioning performance measures including standardized literacy skills tests?

Procedure

Data Used for Analysis

Data generated from the following three sources were analyzed: (1) Army Reserve Officers' Training Corps (ROTC) Achievement Testing Program, (2) ROTC Advanced Camp and Commissioning Files, and (3) OBC grades from Armor, Engineer, and Infantry Schools.

ROTC Achievement Testing Program data. Standardized tests of writing and reading were administered to Military Science (MS) I and MS IV cadets ROTC-wide during the school years 1983-84, 1984-85, and 1985-86. For the purpose of this report, data on Missouri College English Test (MCET) (Callis & Johnson, 1965) and Nelson-Denny Reading Test (NELSON-DENNY) (Brown, Bennett, & Hanna, 1981) from the first two school years were analyzed.

To assess skill levels by using tests, raw test scores alone does not provide enough information. For example, the meaning of a raw score of 112 on NELSON-DENNY, which has a raw score range of 0-172, is not immediately clear. One method for interpreting raw scores is to compare an individual's score against scores made by a large group of individuals. This method translates raw scores into indices of performance relative to the comparison group.

For an earlier, detailed analysis of these data (Hunter, 1986), cadets' test scores were converted to ROTC percentile scores. These percentile scores provide two advantages for the present analyses:

(1) current, age-appropriate comparison group and (2) cadets' scores expressed in terms of the approximate percentage of ROTC cadets whose performance they surpassed. Referring back to the raw score of 112 on the NELSON-DENNY, the corresponding ROTC percentile score for MS IV cadets is 38. Cadets with the score of 112 surpassed 38% of MS IV cadets on this reading test.

The ROTC percentile scores were based on the raw scores generated by 7,300-7,500 MS IV cadets (depending on the test) participating in the ROTC Achievement Testing Program each year. This constituted about 90% or greater segment of the entire MS IV population. The composition of these data sets in terms of gender and ROTC region representations approximated those of the entire MS IV population as reported in the ROTC Enrollment Reports of the respective years (US Army Training and Doctrine Command, 1983, 1984).

ROTC Advanced Camp and Commissioning File data. The ROTC Advanced Camp is a 6-week training exercise, designed by the US Army Infantry School to provide cadets with opportunities to apply their technical/tactical knowledge and leadership skills in simulated tactical situations. Generally, the Advanced Camp is attended by cadets between their junior and senior years in college, i.e., between Military Science (MS) III and MS IV courses. They are evaluated on various military skills and physical readiness, but the main purpose of the camp is the application and development of tactical and leadership skills.

Data from the Advanced Camp in 1982, 1983, and 1984 were used consisting of approximately 9,000 cases per year. From the camp records, summary scores for land navigation (LNAV), rifle marksmanship (RIFLE), physical readiness test (PT), tactical application exercises (TAX), and peer rating of cadets' officer potential (PEER) were examined. These data were selected as possible indicators of various key components of officer potential.

The TAX scores are ratings by the squad officer advisor/trainer (SOAT) based on cadets' performance, both as squad leaders and members, during the simulated tactical application exercises. The summary TAX score is a sum of the following nine ratings: supervision and control of subordinates, ability to work as a squad member, verbal and non-verbal communication skills, decisiveness, technical and tactical proficiency, mission-oriented attitude/motivation, confidence in own actions, effective planning, and mission accomplishment. Individuals' ratings across the nine TAX components are closely associated (internal consistency: alpha = .97). Each cadet selects the top 10 and the lowest 10 cadets from his/her platoon with respect to officer potential. Based on these rankings, one composite peer rating for each cadet is calculated.

The ROTC Commissioning Files contain personnel data of cadets who completed the precommissioning training and were commissioned. From the Commissioning Files of 1983, 1984, and 1985, containing approximately 8,200 cases per year, the following data were examined: cumulative undergraduate academic grade point average (GPA), cumulative Military Science grade point average (ROTC), and Scholastic Aptitude Test (SAT)

and American College Testing Program Examination (ACT) scores when available. (Both college and Military Science GPAs are coded in uniform scales across all ROTC detachments.)

It should be noted that the precommissioning measures listed above would reflect varying degrees of literacy skills. For example, the academic average would consist largely of tests taken in college courses most of which would involve at least some literacy skills. On the other hand, some of the Advanced Camp grades may mostly represent abilities other than literacy skills which are, nonetheless, essential for effective officer performance.

OBC grades. Grades from the Armor, Engineer, and Infantry Officer Basic Courses, extracted from TRADOC's Automated Instructional Management System, were available. The Armor School data covered 15 classes (total of 776 cases) during the period October 1984 to November 1985. The Engineer OBC data covered 4 classes (total of 313 cases) from June to October 1985. The Infantry OBC data covered 5 classes (total of 492 cases) from July to December 1985. The three OBC data sets include the classes immediately after college graduation time as well as classes starting later in the fall. Each school provided the final grade (FINAL) for each student, composed of his/her overall OBC performance in technical/military skills and leadership/management training. In addition, some branch-specific task subscores were available from the Engineer and the Infantry Schools.

The OBC final grades summarize how well students performed in OBCs and is interpreted further as their overall preparedness for officer jobs. On the other hand, since most of the scores included in the final grade are based on paper-and-pencil tests, these grades may also be related to the students' abilities to perform officer tasks requiring literacy skills. It should be noted that the relationship between OBC grades and officer performance in the field remains to be examined and is beyond the scope of this report. Since the instructional contents of the three schools differ, analyses involving OBC grades were performed separately for each school.

Analysis Approach

Table 1 summarizes all measures examined for this report and the total number of cases available for each measure. However, the number of cases available for specific analysis varied depending on the measures being examined. About 4,000 records contained both the achievement test scores and the Advanced Camp data. About 3,000 records contained both the test scores and academic and ROTC grade point averages. For comparisons of the precommissioning and OBC data, about 300 Armor, 90 Engineer, and 300 Infantry records were available.

Table 1

Label, Number of Cases, Mean, Standard Deviation, and the Value Range for Each Measure Analyzed

Source of Data/Measure	Label	No. of Cases	Mean	SD	Range
<u>ROTC Achievement Testing</u>					
Missouri College English Test ROTC Percentile Score of the Total Score	MCET	14,802	49.5	28.9	0-99
<u>Nelson-Denny Reading Test</u>					
ROTC Percentile Score of the Total Score	NELSON-DENNY	14,512	49.5	28.9	0-99
<u>Advanced Camp</u>					
Land Navigation	LNAV	25,710	86.6	12.0	1-100
Rifle Marksmanship	RIFLE	25,710	29.5	5.1	0-40
Physical Readiness Test	PT	25,710	262.2	34.1	1-300
Tactical Application Exercise Total Score	TAX	25,473	24.9	7.7	9-45
Peer Rating of Officer Potential	PEER	25,710	99.9	17.7	1-151
<u>Commissioning File</u>					
Amer Coll Test Prog Exam	ACT	2,508	79.1	29.5	5-134
Scholastic Aptitude Test	SAT	5,563	1027.9	180.4	460-1540
Academic Grade Point Average	GPA	16,482	27.4	4.8	7-40
ROTC Military Science GPA	ROTC	17,959	34.1	5.0	10-40
<u>Armor Officer Basic Course</u>					
Final Grade	FINAL	776	93.7	3.2	77-99
<u>Engineer Officer Basic Course</u>					
Final Grade	FINAL	313	85.2	9.2	23-98
Field Tactical Techniques	FIELD	269	84.1	11.1	0-99
Training/Management	TRMNG	238	91.4	6.6	0-98
Leadership - Advanced	LDSHP	238	84.2	12.2	0-100

(Table 1 continued.)

Table 1 continued.

Source of Data/Measure	Label	No. of Cases	Mean	SD	Range
<u>Infantry Officer Basic Course</u>					
Final Grade	FINAL	492	84.2	8.2	18-98
Training/Management	TRMNG	492	79.6	13.6	20-100
Vehicle Maintenance	MAINT	492	87.0	15.0	0-99
Combined Tactics	TACTIC	492	82.6	13.9	0-100

To examine the degree of association among measures, correlational analyses were performed. All measures used in the correlational analyses were converted into z scores. For MCET and NELSON-DENNY, z scores were derived with reference to the entire MS IV data sample.

In predicting performance from measures collected earlier, the number of cases available for analyses tend to decrease over the span of time. This may be due to (1) natural selection and attrition of applicable cases over time and/or (2) sampling portions of applicable cases for data analysis. Systematic selection of cases or reduction in analysis sample size tends to restrict the variability of scores. Restriction in score variability, in turn, tends to lessen the index of predictive relationship obtained from statistical analyses.

In the case of precommissioning literacy assessment, if a diagnostic test is given in the ROTC basic course before the contracting selection occurs, the variability in test scores may be greater than that for MS IV cadets. The greater range of predictor scores might produce correlations with later measures (e.g., OBC grades) that are higher than those calculated from MS IV test scores. However, for MCET and NELSON-DENNY, the test score variability was comparable between the MS I and MS IV data and also between the MS IV population and the OBC samples. Thus, the correlations reported below are judged to be relatively unaffected by the restriction of test score variability problem. However, such consistency in test score variability may not be found for other literacy skills tests.

In addition, the training performance of cadets scoring in the "low" score range on the achievement tests was examined in more detail. For that examination, cadet records were grouped into the Low Score and Higher Score groups according to the ROTC percentile scores on the MCET. The 25th percentile score was arbitrarily chosen to divide the cadets into these groups, since we currently lack sufficient empirical information as to exactly what score on this test would represent adequate literacy skills for officer job performance. Dividing test score distributions into quartiles for analytical purposes is an often-used convention and should not be interpreted as having specific

implications to decisions concerning diagnostic and/or selection standards.

Findings

The findings are described by each of the four major questions.

Question 1

How consistent are cadets' relative performance levels measured by different standardized tests of similar subject matters? Though MCET and NELSON-DENNY are not being considered for use in the proposed literacy skills assessment, if performance tends to be consistent across these tests, then the findings from the present analyses may be generalized to other standardized literacy tests. In addition, strong associations between some test scores may suggest possibilities for using data already available in some cadet records (e.g., SAT) as indicators of literacy skills.

Finding 1a: Based on the entire data sample, MCET and NELSON-DENNY were highly correlated. However, some cadets performed better on MCET than on NELSON-DENNY, and vice versa. Cadets who did well on MCET were likely to do well on NELSON-DENNY ($r = .73$, Table 2). This finding suggests that the findings reported later based on MCET would be generally applicable to NELSON-DENNY and may also apply to other standardized tests of literacy skills.

Table 2

Correlations Among Standardized Tests for the Total MS IV Sample

Tests	MCET	NELSON-DENNY	SAT	ACT
NELSON-DENNY	.73 (11918)			
SAT	.64 (2611)	.71 (2882)		
ACT	.40 (1265)	.45 (1288)	.42 (270)	
GPA	.33 (7522)	.31 (7727)	.31 (3946)	.22 (1876)

Note: Number of cases contributing to each correlation is shown in the parentheses.

However, a correlation of .73 also suggests that predicting specific individuals' performance from one test to the other would lead to some degree of error. Table 3 shows the distribution of cadets grouped into low and higher MCET score ranges (25 or Below and 26 or Above) by score ranges on NELSON-DENNY. The percentages are with reference to each of the MCET Score groups. 66% of cadets who scored 25 or below on MCET also scored in the same range on NELSON-DENNY. However, 34% of those with MCET scores of 25 or below produced higher scores on NELSON-DENNY.

Table 3

Percentages of Cadets With Low and Higher MCET Scores in NELSON-DENNY Score Ranges

MCET Score Group	NELSON-DENNY Score Range		
	25 or Below	26 - 75	76 or Above
26 or Above	12% (1094)	55% (4966)	33% (2931)
25 or Below	66 (1924)	32 (951)	2 (52)

Note: The numbers of cadets are indicated in parentheses.

Finding 1b: The correlations between SAT and the achievement tests were fairly strong, but ACT and GPA were only moderately correlated with the achievement tests. SAT correlated with MCET and NELSON-DENNY .64 and .71, respectively (Table 2). The correlations would likely be higher if only the verbal score of SAT were analyzed. In the present analysis, only the total SAT scores were available.

The correlations in Table 2 ($r = .40, .45,$) do not indicate strong associations between ACT and the two literacy tests, possibly reflecting the fact that the ACT total score consists of subscores for verbal, math, and social and physical sciences. It should also be noted that the analyses involving ACT were primarily based on cadets attending schools in parts of the Central, South, and Southwest geographical areas and not a representative sample of the entire ROTC population.

The moderately low correlations between literacy skills and GPA in Table 2 (in the low .30s range) further suggest that academic achievement is only partly indicated by literacy skills. Academic GPA has been used as one of the few standards for contracting into ROTC Advanced Course (U.S. Army, 1986). Based on these correlations, GPA would not be a very direct method of assessing literacy skills. However, the low correlations may be due, in part, to variations in grading standards across the institutions hosting ROTC programs.

Question 2

Do the literacy skills measured by MCET and NELSON-DENNY overlap with other precommissioning indicators of officer performance? If some cadets have problems in literacy skills, do they tend to have problems in other aspects of officer training? Or, do strengths in other skills compensate for their literacy problems?

Finding 2a: The relationships between the achievement test scores and Military Science summary grades are moderately low. (See Table 4.) The correlations between MCET and NELSON-DENNY and ROTC Military Science grade (.30 and .29, respectively) suggest that literacy skills have some impact on the overall ROTC performance which, to a large extent, may represent achievements in other skill areas.

Table 4

Correlations Among Achievement Test Scores and Other Precommissioning Measures

	NELSON-							
	MCET	DENNY	GPA	ROTC	LNAV	RIFLE	PT	TAX
ROTC	.31	.30	.47					
LNAV	.26	.24	.18	.21				
RIFLE	.05	.08	.00	.03	.14			
PT	.03	-.01	.12	.11	.09	.05		
TAX	.09	.12	.11	.10	.17	.04	.09	
PEER	.10	.10	.11	.21	.24	.18	.24	.13

Note: The cases used for analyses ranged from 7522 to 25473.

This relationship is illustrated further in Table 5. The majority of cadets with MCET scores of 25 or below were not in the lowest 25% in terms of Military Science grades; 12% of them were in the highest 25% of Military Science grades. (Note: The Military Science score ranges refer to the entire analysis sample and not by individual institutions.)

Table 5

Military Science Grades for Cadets Scoring 25 or Below on MCET and for Cadets with Higher MCET Scores (Percentages of Each MCET Group)

MCET Score Group	Military Science Grade Range		
	Lowest 25%	Middle 50%	Top 25%
26 or Above	19% (1256)	55% (3678)	26% (1730)
25 or Below	38 (756)	50 (972)	12 (235)

Note: The numbers of cadets are indicated in parentheses.

Finding 2b: Except for land navigation (LNAV) which showed some overlap with the literacy tests (.26 and .24), all other Advanced Camp measures yielded negligible associations with MCET and NELSON-DENNY, ranging between -.01 and .12. (See Table 4.) This is demonstrated further by scores on the tactical application exercises (TAX). As Table 6 shows, most of the cadets with MCET scores of 25 or below were rated as performing in the higher ranges in terms of the nine dimensions included in TAX. About one-fourth of the "Low MCET" group ranked in the highest 25% for TAX. On the other hand, about one-fifth of the "Higher MCET" group ranked in the lowest 25% range for TAX.

Table 6

Tactical Application Exercise Grades for Cadets Scoring 25 or Below on MCET and Cadets with Higher MCET Scores (Percentages of Each MCET group)

MCET Score Group	TAX Grade Range		
	Lowest 25%	Middle 50%	Top 25%
26 or Above	21% (1908)	46% (4217)	33% (3017)
25 or Below	26 (805)	50 (1499)	24 (718)

Note: The numbers of cadets are indicated in parentheses.

The generally low correlations between the literacy tests and ROTC performance measures suggest that (a) the tests and the performance measures assess different skill areas, (b) all of these measures collectively may yield a multi-faceted assessment of cadet's officer potential but (b) assessment of literacy skills would require instruments/procedures specifically designed for that purpose.

Finding 2c: Correlations among the ROTC measures (Advanced Camp and Military Science grades) tended to be low, ranging from .03 to .24. (See Table 4.) Correlations of these magnitudes suggest that cadets scoring high in one skill area may, or may not, perform similarly well in other skill areas. (It should be noted that low correlations could be due to inconsistent grading/rating standards across institutions and Advanced Camps or due to most cadets scoring in a similar, narrow range of scores.)

Question 3

How well do literacy test scores predict performance in Officer Basic Courses? If cadets score in the low range on tests of literacy skills, how do they perform in OBC?

Finding 3: The MCET was moderately associated with OBC final grades at the Armor and Infantry OBCs (.47 and .40, respectively). (See the first column of Table 7.) While these correlations do not indicate a large overlap, they are fairly strong for predicting a multi-faceted performance measure from a specific basic skills test.

Table 7

Correlations Between Precommissioning Measures and Officer Basic Course Performance

OBC Grades	Precommissioning Measures						
	MCET	GPA	ROTC	LNAV	RIFLE	TAX	PEER
<u>Armor OBC</u>							
FINAL	.47***	.24	.32***	.42***	.14**	.14**	.16**
<u>Engineer OBC</u>							
FINAL	.25*	.36***	.29**	.45***	.12	.16	.18
FIELD	.06	.23*	.08	.26**	.15	.07	.00
TRMNG	-.01	.17	-.13	.29**	.19	.01	.01
LDSHP	.14	.05	.01	.26**	.00	.26**	.26**
<u>Infantry OBC</u>							
FINAL	.40***	.24***	.23***	.22***	.05	.23***	.28***
TRMNG	.29***	.21***	.15**	.19***	.01	.07	.23***
MAINT	.15**	.08	.11*	.04	.06	.15	.09
TACTIC	.23***	.13*	.08	.14**	.01	.19***	.18***

Note: Analysis samples for AOBC ranged 294-389. Samples for EOBC ranged 86-116. Samples for IOBC ranged 300-350.

* p < .05. ** p < .01. *** p < .001.

These correlations may be further examined in the distribution of OBC final grades for those who scored relatively low on the MCET and for those who scored higher. Table 8 shows that about one-half of the "Low MCET" group performed in the lowest 25% range in AOBC and IOBC (56% and 45%, respectively). Almost half of this group performed better than the lowest 25% range in OBC, while some of the "Higher MCET" group were in the lowest 25% range for OBC performance.

Table 8

OBC Final Grades for Cadets Scoring 25 or Below on MCET and Cadets with Higher MCET Scores (Percentages of Each MCET Group by School)

MCET Score Group	OBC Final Grade Range		
	Lowest 25%	Middle 50%	Top 25%
<u>Armor OBC</u>			
26 or Above	22% (49)	49% (110)	29% (67)
25 or Below	56 (38)	41 (28)	3 (2)
<u>Engineer OBC</u>			
26 or Above	17 (12)	60 (43)	23 (17)
25 or Below	21 (4)	50 (7)	29 (3)
<u>Infantry OBC</u>			
26 or Above	13 (30)	56 (126)	31 (69)
25 or Below	45 (34)	47 (35)	8 (6)

Note: The numbers of OBC students are indicated in the parentheses.

As shown on Table 7, the correlation between MCET and the OBC final grades was lower for the Engineer OBC (EOBC) (.25), which, based on a small analysis sample of 86, does not indicate a strong relationship. The correlations between NELSON-DENNY and the OBC grades were nearly identical to the MCET correlations for all schools and are not included in Table 7.

While showing generally low relationships with specific course grades in the EOBC, the MCET scores were somewhat related to the IOBC grades in training/management, vehicle maintenance, and tactics. Even these correlations, however, are low, ranging .15 to .29. Without additional data, the relationship between the writing skills (as measured by MCET) and performance in separate components of OBC training remains inconclusive.

Table 7 also shows correlations between the ROTC training grades and OBC performance, some of which may support the validity of the precommissioning training and assessment for OBC requirements. For example, Military Science grades and land navigation produced significant correlations with OBC final grades at all three OBCs (ranging .22 to .45). For EOBC, land navigation grades were significantly correlated with all OBC subscores examined, and TAX and PEER correlated with OBC leadership training grade. (The small sample size for EOBC introduces some uncertainty as to the accuracy of these correlations.) For IOBC, Military Science grade, land navigation, TAX, and PEER produced some significant correlations with OBC training/management and tactics grades. But, on the whole, the correlations are low and the results should be considered as tentative.

Rifle marksmanship and PT in Advanced Camp did not show much relationship with individual differences in OBC performance (correlations for PT not shown on Table 7).

Question 4

Given that the OBC training involves diverse skill domains, all of which are assumed to be components of officer jobs, how well would these precommissioning measures predict overall OBC performance? What is the contribution of literacy test scores to this prediction?

To answer these questions, stepwise multiple regression analyses (Dixon & Jennrich, 1981) were conducted. The predictors examined were: MCET, academic GPA, Military Science grade (ROTC), land navigation (LNAV), tactical application exercise (TAX), and peer ratings at Advanced Camp (PEER). Rifle marksmanship and PT were not included in the analyses, since they produced very low correlations with OBC grades. The EOBC results are not reported since they are judged to be unreliable due to an insufficient number of available cases for this analysis.

Finding 4: The MCET score was the best predictor, among the precommissioning measures examined, of the OBC final grades at the Armor and Infantry Schools. Table 9 lists the precommissioning measures which significantly contributed to prediction of OBC performance (in the order of the amount of contribution). The predictors not listed did not make statistically significant contributions in the prediction analyses.

The figures in the "Multiple Correlation" column indicate the increases in predictive accuracy as each contributing measure is added to the analysis. Since OBC grades are composite summaries of diverse abilities and skills, a set of predictors would be expected to include measures of varied attributes. This variation was obtained among the measures that significantly predicted AOBC and IOBC performance. Only one measure -- the MCET -- was common for these two schools. Relative to the other measures, MCET scores also made the largest contribution to prediction of performance in both schools.

Table 9

Multiple Correlations Between Precommissioning Predictor Measures and OBC Final Grades

Precommissioning Measures Predicting OBC Final Grades	Multiple Correlation	F
<u>Armor OBC (N = 191)</u>		
MCET	.49	60.05
LNAV	.61	37.11
ROTC	.64	13.96
<u>Infantry OBC (N = 196)</u>		
MCET	.34	25.86
GPA	.38	6.60
PEER	.43	8.62

Note: All measures analyzed were standardized.

Discussion

The major findings will be summarized with reference to the issues pertinent to the Task Force mission.

1. For the entire analysis sample, cadets' performance on two standardized tests of literacy skills were similar. Thus, the pattern of findings based on Missouri College English Test or Nelson-Denny Reading Test may generally apply to other standardized tests of literacy skills.

However, on an individual level, cadets' score on one test may not necessarily coincide with the same level of performance on the other test. Establishment of standards for literacy skills diagnosis should be based on distribution of scores on the particular test to be used, collected from a representative sample of cadets.

2. The achievement tests and ROTC training measures were not highly correlated. Collectively, all these measures may provide a method to assess various aspects of cadets' officer potential. However, assessment of literacy skills would require methods specifically designed for that purpose. The correlations also suggested that, with the "whole person" assessment, some cadets with deficiencies in some skills may achieve higher ratings for other skill areas.

3. The writing and reading abilities as measured by MCET and NELSON-DENNY were found to be related to overall performance at AOB and IOBC. The correlations on Table 7 show that cadets scoring relatively low on the tests also tend to perform in the lower range in OBCs more than cadets scoring higher on the tests.

The correlations between MCET and OBC final grades may be considered fairly sizable in the traditional job selection framework. That is, even with correlations in the .40s range, knowing cadets'

scores on these tests would improve the accuracy of selecting those who are likely to do well, say, in OBC training.

However, increasing the selection efficiency is currently not the primary objective of the Task Force. The precommissioning literacy standards, when established, are intended to identify cadets who might need developmental teaching in order to perform junior officer tasks effectively. In this context, the correlations in the .40s range also mean that about one-half of cadets in the lowest quartile of MCET scores performed at higher levels with regard to overall OBC training. For many of these students, strengths in skills not measured by these tests or their effort may have compensated for their writing/reading problems. On the other hand, it is plausible that their OBC and subsequent job performance might be enhanced even more with improvements in their literacy skills.

Aside from the need to refine the assessment standards, the outcome of the pilot project needs to be examined with regard to the social/political ramifications of the program. As described in an earlier report (Hunter, 1986), gender differences in the MCET and NELSON-DENNY scores were minor, but there were performance differences by racial/ethnic groups. The use of any standardized literacy skills test will probably lead to an overrepresentation of minority ethnic groups among the cadets recommended, or required, to receive developmental teaching. Whether or not this would constitute an adverse (i.e., negative) impact would depend on the design and implementation of the literacy standards program. Will the developmental teaching create a serious overload in cadets' time commitments? Will being identified as needing additional training leave a carry-over effect in the overall cadet evaluation, even if the literacy skills are improved? If this type of problems are avoided, then developmental training should not hurt anyone whose literacy skills fall markedly below the average range of his/her peers. Whether or not the proposed program may create an adverse (i.e., not differential per se, but negative) impact on some subgroups also is an issue to be evaluated in the course of the pilot project.

Conclusion

Standardized literacy tests may be one of the better predictors of OBC performance, possibly due to the uniformity in testing and scoring. There seems to be some tendencies for cadets scoring in the low range on a standardized literacy skills test to perform relatively poorly in OBC. Standardized tests would provide consistency in the literacy skills screening administered across highly heterogeneous institutions.

On the other hand, the accuracy of the assessment technology is such that neither standardized tests nor other precommissioning measures precisely predict OBC performance. Currently, there is no systematic basis by which to determine which test score would consistently differentiate poor and high performance in OBC. Furthermore, all subjects examined for the OBC analyses did graduate from OBC, and we do not have information on how relatively low performance in OBC is related with subsequent job performance.

In order to establish sound precommissioning literacy skills standards, much more information is needed. The pilot project should provide a valuable means by which to refine the assessment procedures, evaluate the effectiveness of developmental teaching, examine the relationships between the assessment measures used and junior officer performance, and investigate the possibility of differential impact of the program on subgroups.

References

- Brown, J. I., Bennett, J. M., & Hanna, G. (1981). The Nelson-Denny Reading Test: Examiner's Manual. Chicago: The Riverside Publishing Company.
- Callis, R., & Johnson, W. (1965). Missouri College English Test: Manual for Forms A, B, and C. New York: Harcourt, Brace and World, Incorporated.
- Dixon, W. J., & Jennrich, R. (1981). Stepwise regression. In W. J. Dixon, (Chief Ed.), BMDP statistical software: 1981. Berkeley: University of California Press.
- Hunter, F. T. (1986). ROTC Achievement Testing Program: School years 1983 - 1985 (Research Report No. 1429). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- U.S. Army Training and Doctrine Command. (1983). Closing enrollment report school year 1983-84 Army Reserve Officers' Training Corps. Fort Monroe, VA: Author.
- U.S. Army Training and Doctrine Command. (1984). Closing enrollment report school year 1984-85 Army Reserve Officers' Training Corps. Fort Monroe, VA: Author.
- U.S. Department of the Army. (1986). ROTC Study final report (Volume 1). Washington, DC: Reserve Officers' Training Corps Study Group.